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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/730,982

12/10/2003

Atuhito Mochida

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EXAMINER

STONER, KILEY SHAWN

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

01/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/730,982

Applicant(s)

MOCHIDA ET AL.

Examiner

Kiley Stoner

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-26 and 28-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 26 and 29 is/are allowed.
- 6) ☒ Claim(s) 18-25, 28 and 30-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Amendment After Final

The amendment after final which was received on 12/20/07 has been entered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18-22, 24, 30, 32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hawrylo (USPN 4576326) in view of Kurpiela (USPN 5579979).

Hawrylo teaches a method of mounting a semiconductor component by heating a bonding member (14) on a submount (12) on a heating table and positioning the component which is heated and pressed by a collet (thermocompression tool) on the submount with pressure (figures 1, 4, col 1 lines 9-45, col 2 line 60 – col 3 line 27). The collet and table are heated to an appropriate temperature (col 4 lines 15-25) however the temperatures are not further disclosed. Neither is keeping heat from the heating table away of the collet or releasing the device before complete solidification.

It would have been obvious to one of ordinary skill in the art at the time of the invention to control heating of both the collet and table during each phase of bonding to

prevent thermal damage to the devices. During placement heating both to the same temperature will prevent warping. As the heating table comprises a heatsink (12) most heat will stay below the collet and be drawn to the sink. It is unlikely that heat would flow upward to the collet when there is heatsink present and the tool has its own heat source. By releasing the device prior to complete solidification the part can align itself without risk of damage due to collet pressure.

With respect to the limitation that "said collet has a contacting side having an area larger than that of a contacting portion of said semiconductor laser component" it is the examiner's position that Figures 1 and 2 of Kurpiela clearly depict a contact surface 5 that has a larger area than component 15. Note in Figure 1 how contact surface 5 in certain locations extends all the way to the housing 2. Furthermore, it is the examiner's position that at the time of the invention it would have been obvious to one of ordinary skill in the art to employ a collet having a contacting side with an area as large or larger than a contacting portion of said semiconductor laser component in order to insure an even force distribution over the surface of the component being bonded. As long as the area of the contacting surface of the collet is as large or larger than a contacting portion of said semiconductor laser component a uniform bond will be more readily formed.

With respect to claims 24 and 32, the examiner takes Official Notice that it is well known in the art to cool a bond with forced air. Thus, it is the examiner's position that the step of solidifying a portion of a bonding member with forced air would have been obvious to one of ordinary skill in the art. Decreasing the time required for solidification of the bonding member would increase the productivity of the process. In addition,

removing heat from the bonding member with forced air would prevent the heat in the bonding member from thermally degrading the semiconductor laser device.

Claims 23, 25 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hawrylo (USPN 4576326) and Kurpiela (USPN 5579979) as applied to claims 18, 22 and 30 above, and further in view of Powers et al. (US 2004/0195297 A1).

Hawrylo teaches a method of mounting a semiconductor component by heating a bonding member (14) on a submount (12) on a heating table and positioning the component which is heated and pressed by a collet (thermocompression tool) on the submount with pressure (figures 1, 4, col 1 lines 9-45, col 2 line 60 – col 3 line 27). The collet and table are heated to an appropriate temperature (col 4 lines 15-25).

However the bonding member is not further disclosed.

Powers teaches bonding a semiconductor component with a bonding material comprising at least two elements having different fusing points, including Au/Sn and In, wherein the component is held in place until solidified (paragraphs 10 and 19-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to make the bonding pads of a lead free solder with at least two metals with different fusing points or a material with a melting point less than eutectic solder to provide reliable, environmentally safe, bonds over a narrow temperature range thereby avoiding damage to the component and substrate.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hawrylo (USPN 4576326) and Kurpiela (USPN 5579979) in view of Powers et al. (US 2004/0195297 A1).

Hawrylo teaches a method of mounting a semiconductor component by heating a bonding member (14) on a submount (12) on a heating table and positioning the component which is heated and pressed by a collet (thermocompression tool) on the submount with pressure (figures 1, 4, col 1 lines 9-45, col 2 line 60 – col 3 line 27). The collet and table are heated to an appropriate temperature (col 4 lines 15-25).

However the bonding member is not further disclosed.

Powers teaches bonding a semiconductor component with a bonding material comprising at least two elements having different fusing points, including Au/Sn and In, wherein the component is held in place until solidified (paragraphs 10 and 19-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to make the bonding pads of a lead free solder with at least two metals with different fusing points or a material with a melting point less than eutectic solder to provide reliable, environmentally safe, bonds over a narrow temperature range thereby avoiding damage to the component and substrate.

With respect to the limitation that "said collet has a contacting side having an area larger than that of a contacting portion of said semiconductor laser component" it is the examiner's position that Figures 1 and 2 of Kurpiela clearly depict a contact surface

5 that has a larger area than component 15. Note in Figure 1 how contact surface 5 in certain locations extends all the way to the housing 2. Furthermore, it is the examiner's position that at the time of the invention it would have been obvious to one of ordinary skill in the art to employ a collet having a contacting side with an area as large or larger than a contacting portion of said semiconductor laser component in order to insure an even force distribution over the surface of the component being bonded. As long as the area of the contacting surface of the collet is as large or larger than a contacting portion of said semiconductor laser component a uniform bond will be more readily formed.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hawrylo (USPN 4576326) as applied to claim 18 above, and further in view of Laub et al. (USPN 3790738).

Hawrylo teaches a method of mounting a semiconductor component by heating a bonding member (14) on a submount (12) on a heating table and positioning the component which is heated and pressed by a collet (thermocompression tool) on the submount with pressure (figures 1, 4, col 1 lines 9-45, col 2 line 60 – col 3 line 27). The collet and table are heated to an appropriate temperature (col 4 lines 15-25).

However the collet material is not disclosed.

Laub teaches a semiconductor bonding method using a low conductivity collet (col 3 lines 35-59 and col 4 lines 5-35) with temperature control (col 7 line 58 – col 8 line 4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a low conductivity collet to prevent thermal damage to the devices.

Response to Arguments

Applicant's arguments with respect to claims 18-25, 28 and 30-34 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

Claims 26 and 29 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiley Stoner whose telephone number is 571-272-1183. The examiner can normally be reached Monday-Thursday (9:30 a.m. to 8:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jonathan Johnson can be reached on 571-272-1177. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

 1/8/08
Kiley Stoner

Primary Examiner A.U. 1793